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ABSTRACT

Mentally retarded persons in sheltered workshops in West Virginia were studied in order to determine their learning styles and how these learning styles related to the populations studied by Witkin and others. (Witkin classified learning styles as either field independent--i.e. task oriented--or field-dependent--i.e., oriented to the social factors surrounding learning, such as relationship with the teacher and classroom emotional atmosphere.) Data were gathered by administering the Portable Rod-and-Frame Test (PRFT) and the Columbia Mental Maturity Scale and analyzed by the application of the Statistical Package for the Social Sciences programs, the Goodness of Fit Test, the Pearson Product Movement Correlation, and the t-test. These analyses supported the following conclusions: (1) there is a significant difference between the mentally retarded population used in this study and the population used by Witkin, in that the retarded persons were more field-dependent; (2) the PRFT is an appropriate instrument to use in identifying the degree of field-dependence and field-independence as preferred learning styles among mentally retarded persons in sheltered workshops; and (3) there are no significant relationships between PRFT scores and mental age and between male and female students in the retarded population. Based on these conclusions, it was recommended that mentally retarded students should be assessed for field-dependent or field-independent cognitive styles and these preferences should be taken into account in designing curricula for them. (KC)

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AN INVESTIGATION OF FIELD-DEPENDENT AND FIELD-INDEPENDENT COGNITIVE STYLE IN MENTALLY RETARDED INDIVIDUALS IN SHELTERED WORKSHOPS IN WEST VIRGINIA

Ben Harold Dickens

An Abstract

For

the Vocational Education Department

Auburn University

U.S. DEPARTMENT OF EDUCATION
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One of America's traditions is to provide access and opportunities for education to all of its people. The schools have been delegated the responsibility of educating or preparing citizens for life as productive members of society. Venn (1973) noted that:

> past failures with mounting social problems and changes are shifting a formidable burden on our educational system; therefore, any hope for permanent solutions to the problems that threaten our nation's future lie in the education and development of each person for a productive and meaningful life. (p. 13)

During the past several decades educators have become increasingly concerned with students who leave the educational system lacking the skills and knowledge to survive in the world of work. Public Law 94-142, The Education of All Handicapped Children Act, was enacted to ensure that the physically and mentally handicapped were not excluded from educational programs which could increase their access to and opportunities to prepare for traditional and non traditional jobs. New kinds of programs, as well as modifications to traditional ones, have been initiated to provide such individuals with skills to live and make a living. Public Law 94-142 reemphasizes that the continuing fundamental purpose of education is to prepare both youth and adults to live a productive and rewarding life.

Nearly 2.5 million students leave the formal education system of the United States each year without adequate preparation for a career. In the 1970-71 school year 850,000 elementary and secondary students dropped out of school. High school graduates enrolled in the general curriculum who did not attend college accounted for another 750,000, and high school students who entered college in 1967 but did not complete the baccalaureate degree or an organized occupational program were another 850,000 (The Need For Educational Reform, 1971).

In addition to concern about dropouts and non-completers there are complaints throughout the country that curricula are dull and irrelevant, that they are not opening pathways to a fulfilling adulthood. In addition to these complaints, large numbers of students are scoring below grade level in basic skills; schools are experiencing high incidence of trouble such as vandalism and assaults on administrators, teachers, and other students. These are some of the symptoms or signals of discontent on the part of students, parents, and the public.

Hoyt et al., (1972) in Career Education pointed to one of the elements which can be provided to make learning more effective for each individual.

> It is the learning environment that stimulates discovery and encourages curiosity. That is where the lights go on or where they get turned off. Unfortunately, and too often some environments demand of the learner a conformity and set of responses to a specific code of behavior

> and performance invented in an earlier society and useful only in an era long past. (Hoyt, Evans, Mackin, & Mangum, 1972, p. 38)

Cronbach (1963) pointed out some relationships between teaching and learning. By knowing various characteristics about students, a teacher could: (a) design instruction which is most likely to aid each student's learning, (b) determine whether learning has occured, and (c) redesign instruction to ensure that learning occurs. Gagne' (1965) defined learning as "a change in human disposition or capability which can be retained and which is not simply ascribable to the process of growth" (p. 5).

Benjamin Bloom (1976) pointed out that when he first entered the field of education the prevailing construct was:

1. There are good learners and there are poor learners.
2. There are faster learners and there are slower learners.
3. Most students become very similar with regard to learning ability, rate of learning, and motivation for further learning when provided with favorable learning conditions. (p. ix)

The above third construct has far reaching implications for persons with special needs which are also part of the concern of P.L. 94-142. If student learning styles can be identified and these become part of the learning environment, this process can become the key to more effective and efficient learning by the student, whether an average

student or one with special needs. Managing learning and learning environments to create favorable learning conditions can also be a vital element in teacher education. Teacher prepartation, especially for teachers of students with special needs, must include methods of instruction in classrooms, student selection or identification methods, instructional techniques and student evaluation procedures. For both student and teacher the development of new curricula and instructional systems which incorporate these considerations at local, state, and national levels, could result in much more efficient and effective teaching and learning for those students who in the past have been no one's special concern. Even more important are the effects of adequate or inadequate teaching and learning on the student's view of himself. Although developing a positive self concept may be over emphasized as a remedy for many learning dysfunctions, it does affect student lives. The persons' interest in learning and use of their learning style and ability as a means of becoming self sufficient and being able to adapt to change throughout their lives may be the difference between a tax producer or a tax consumer.

One recent approach to the notion that most students can learn what the schools have to teach has been developed under the rubric of mastery learning. Although there are several versions of mastery learning being discussed at the present, all begin with the notion that most students can

attain a high level of learning if instruction is approached sensitively and systematically.

Hill (1976) stated:

> no two students seek meaning in exactly the same manner. We believe that 90 percent of the students with normal ability can learn 90 percent of the material 90 percent of the time if the teaching methods and media are adjusted to the students educational cognitive style. (p. 3)

Although this investigator's interest was primarily with students who have learning disabilites or who are handicapped by mental retardation, a level of mastery seems appropriate as a goal for all students even if the students cannot set the goals themselves. This level must be prescribed by teachers and parents.

Bruner (1966) argued that a "theory of instruction should be prescriptive. Its usefulness depends on establishing rules concerning how knowledge can be effectively communicated and learned" (p. 40). One feature of such a theory dealt with how a body of knowledge should be structured to provide optimal learning for students. Cognitive theorists have approached this problem by proposing a process of learning and remembering which suggests that materials to be learned have to be organized to enhance the internalizing process. This approach, which Bruner suggested, assumes that there is some congruence between the structure of the instructional material and the students' learning process or cognitive style.

1. Field-independent persons perform better than field-dependent persons on tests which involve separating a part from an organized whole or rearranging parts to make a whole.
2. Field-independent children tend to be "task centered" in taking tests; field-dependent children tend to glance at the examiner and pay more attention to the social atmosphere of the testing situation.
3. Field-dependent persons appear to be more imaginative in verbally describing social situations. The social environment seems to be more significant for the field-dependent persons in other ways. They tend to remember faces and social words better than field-independent persons. They are more influenced by expressions of confidence or doubt than are field-independent persons.
4. Students and teachers who share a common cognitive style tend to perceive each other more favorably than do students and teachers whose cognitive styles are dissimilar.
5. Field-dependent persons prefer psychotherapists with whom they can establish a personal relationship, field-independent persons on the other hand, prefer therapists, who take a more passive, consultant like role. Field-dependent and field-independent psychotherapists, in turn, tend to prefer the very kinds of client-therapist relationships that field-dependent and field-independent persons respectively seem to be seeking. (p. 12)

Field-dependent and field-independent persons with their many differences have been influenced in different ways by their learning environment. The classroom environments, the teacher-student relationship, the teaching styles have been geared to the field-independent learner. People who have given serious attention to this question have often concluded that American public schools usually incorporate the field-independent communication styles, human relation

Tailoring the learning environment to students' preferred cognitive style is an important first step in making education realistic. Cognition means nothing more than thinking or knowing (Ramirez, Herold, & Castaneda, 1974), and the term has typically been used to express the idea that people differ from one another in the way they think and process information. Cognitive style is a description of the way an individual seeks meaning from the formalized structures of knowledge (Nunney, 1963). A theory with a different emphasis was developed by Witkin (1978) and his colleagues. Cognitive style, as referred to in their model, indicates tendencies toward field-dependence or field-independence.

> The tendency to rely primarily on internal referents in a self-consistent way we designate a field-independent cognitive style. The tendency to give greater credit to external referents is a field-dependent cognitive style. It is, in part, because the one tendency or the other is a pervasive characteristic of that person that the term "style" seems appropriate. (p. 16)

Further,

> The field-dependent and field-independent cognitive styles are process variables, they represent techniques for moving toward a goal, rather than competence in achieving goals. (p. 26)

Researchers have found other differences than the external and internal referents between field-dependent and field-independent persons. Ramirez (1974) listed some research findings which may have significance for educators.

styles, incentive-motivation styles, and ways of thinking and perceiving (Cohen, 1969).

Benjamin Bloom, as quoted by Evans (1971), pointed out that it is more common for a school to accept responsibility for presenting material to all students than it is to assume responsibility for seeing that all students master certain specific skills, knowledge and attitudes.

> If the school actually assumes responsibility for mastery of certain content by all students, it will find certain students who have not learned through the traditional approach which emphasizes the authority of the teacher as the source of educational relevance. If society does not permit the school to allow its failures to escape through dropping out or "social promotion", it will be forced to find techniques which meet the needs of each of these students. (p. 44)

Rogers (1969), in his book Freedom to Learn, stated that he considers education to be in a dilemma:

> when we put together in one scheme such elements as a prescribed curriculum, similar assignments for all students, lecturing as the only mode of instruction, standard tests by which all students are evaluated, and instructor-chosen grades as the measure of learning. (p. 5)

This is a dilemma not only for the average and talented students but especially for those with a handicap, retardation, or other learning disabilities.

Teachers who have been working with such handicapped youth, as well as all others have been interested in finding ways of identifying how such individuals learn best so that

they can better adapt their teaching strategies to the students' learning styles.

Sankovsky (1976) said:

> historically, education has been more program oriented than student oriented. All students were exposed to the same materials in the same format, and each student was expected to achieve at the same rate. Individual needs, individual learning styles were not met and the student who did not conform to the traditional format soon fell behind. Since many of the students did not experience great difficulty in learning in the traditional form, those unfortunate students who fell behind were all but isolated from the educational process. Social promotion rather than promotion on the basis of achievement keep these students flowing through the mainstream until they are either graduated or of age to quit school. (p. 1)

Our system still leaves a large number of students who need other techniques and resources to achieve their maximum potential as learners.

Many educators are now recognizing that each individual has a style of learning that is unique to that individual and that new teaching techniques and resources are now available to help reap the most benefits from some of these learning styles.

Recent research (Witkin, Goodenough, & Oltman, 1979) on the development of self-concept or a self-identity has demonstrated that field-dependent people tend to have an interpersonal orientation (they prefer to be with people who help them make decisions). Field-independent people prefer to work things out by themselves rather than with people; they have an impersonal orientation. Compared to

field-independent people, field-dependent ones favor social over solitary situations; field-dependent persons prefer to be physically close in an interaction situation; field-dependent persons are selectively attentive to social sources of information; they are open in expressing their feelings and thoughts, an approach likely to elicit similar behavior from others toward them.

This investigator after nine years as a teacher of vocational agriculture-horticulture at a center for the mentally handicapped, observed that mentally retarded students exhibited varying degrees of interest in learning depending on teaching methods or strategies used to present information. Some students seemed highly motivated by a field-dependent or social type teaching style, especially if it seemed to contribute to the improvement of their living and survival skills. Others were more responsive to the more formal field-independent or problem solving teaching style.

This interest in the different learning styles the mentally retarded population seemed to have and the effect different teaching strategies seemed to have on how these individuals learned best or most was a problem that seemed to merit further study. A first step it seemed was to find whether or not a relatively rapid and uncomplicated method of determining learning styles could be developed or was already in existence. Further emphasis was added by some of the Federal legislation (PL 94-142) passed in 1975.

Public Law 94-142, The Education Act of All Handicapped Children of 1975, was passed in order to ensure full educational rights or free and appropriate educational opportunities for all handicapped children. Many developments have emerged in education since 1975 for handicapped students that affect the roles of all teachers, including the following:

1. The wave of judicial pronouncements concerning the rights to education, right to appropriate education in the least restricted environment, and the right to participation in placement decisions (PARC v. Pennsylvania).
2. The virtual "shutdown" on school exclusions, expulsions, and suspensions (Goss v. Lopez).
3. The return of many persons from residential institutions to the community, resulting in the obligation of local schools to serve many handicapped students.
4. The launching by local schools of programs for persons formerly believed to be uneducable.
5. The rapid erosion of the traditional boundaries between regular and special educators.
6. The emergence of new support or indirect roles for special education teachers that involve teaming with regular educators.
7. The requirements that parents be notified before any special "diagnosis" or assessment of their child is undertaken in educational planning.
8. The serious objections by many parents and minority groups to the prevailing system for testing, classification, and placement of the children in special classes in school. (Reynolds & Birch, 1977, p. 3)

Witkin's research led this investigator to the Rod and Frame Apparatus.

Rod and Frame Apparatus

One of the mostly widely used measures in the study of field-dependent, field-independent behavior has been the Rod-and-frame Test (RFT) (Witkin, Dyk, Goodenough, & Karp, 1962; Witkin, Lewis, Hertzman, Machover, Meissner, & Wapner, 1954). The RFT has evolved over the last decade into one of psychology's most frequently used measures of individual differences (Lester, 1968). Witkin operationally defined the construct of perceptual style in terms of performance on the RFT, using magnitude of error to differentiate individuals as either field-dependent or field-independent (Cabe, 1968). The original RFT apparatus required the use of a completely darkened room which made certain research investigations, especially with children, difficult and often impossible. Oltman (1968) described the development of a Portable Rod-and-frame (PRFT) apparatus of tabletop size. He presented standardization data for college age students, a correlation of .89 between scores on the PRFT and the standard version RFT. Freed from the necessity for total darkness and permanence of installation, it became possible to expand the investigative uses of this apparatus. The PRFT could be brought to the subject and the elimination of a completely darkened room opened possibilities for the use of the PRFT with subjects of younger ages and potential populations with varying handicaps including limited ability to read or even inability to read.

Witkin's concept of field-dependence and field-independence identification seemed to combine many theories of learner and learning differences and difficulties. In working with mentally retarded individuals learning progress is often determined by the student's understanding of learning expectations for both field-dependent and field-independent persons. The PRFT apparatus as an instrument to measure field-dependence and field-independence has shown good reliability (Witkin, Moore, Goodenough, & Cox, 1977).

In searching for assessment instruments used to help work with mentally retarded students attention was directed to the Columbia Mental Maturity Scale (CMMS) which does not require reading ability on the part of the individual responding.

The CMMS is an individually administered intelligence test designed to yield an estimate of the intellectual ability of children in mental age. The CMMS differs from other individual intelligence measures in that it was designed to measure intelligence of handicapped children and this pictorial type classification test calls for no verbal response and for a minimum of motor response from the participant. These characteristics make the test particularly suitable for use with individuals having serious verbal or motor impairment. This test is also appropriate and effective for use with normal persons (Columbia Mental Maturity Scale Manual, 1954).

Statement of the Problem

The problem of this study was to determine if the Portable Rod-and-frame Test is an appropriate instrument to use to identify the degree of field-dependence or field-independence as preferred learning styles among the mentally retarded population in sheltered workshops of West Virginia. The study was further designed to determined whether the mentally retarded population differed significantly from normal populations in previous investigations and if differences in PRFT scores were related to age or sex.

Based on the preceding statements, it was hypothesized that the PRFT would reveal:

Null Hypothesis One: There is no statistically significant difference in the distribution of individuals identified as field-dependent and field-independent by the PRFT among the mentally retarded individuals as compared to the findings for the population tested by "Witkin."

Null Hypothesis Two: The correlations between the average deviations of the students scores on the PRFT and their chronological age, mental age, Columbia Mental Maturity Scale Score and IQ will not be statistically different from 0.00 at the .05 probability level.

Null Hypothesis Three: There are no statistically significant differences between male and female students of mentally retarded population as determined by the use of the

PRFT apparatus for identifying field-dependence or field-independence.

The purposes for gathering this information was to answer the following questions:

1. Does the PRFT readily identify field-dependent and field-independent individuals among mentally retarded students?

2. Are the percentage results of the mentally retarded population different from the results found in the general population?

3. Is there a difference in field-dependence and field-independence of mentally retarded individuals on the PRFT scores when analyzed by sex?

4. Does mental age become a variable among the mentally retarded population when using the PRFT to identify field-dependence and field-independence?

Significance of this Study

Educators, clinicians, and workers in the area of mental retardation have long been aware of the inadequacy of the total IQ for either describing a person's intellectual functioning or for comparing individuals. The use of the Portable Rod-and-frame Test with this population for the determination of field-dependence and field-independence was an analysis of their perceptual function rather than their performance or verbal type abilities. The concern is therefore to identify cognitive learning styles rather than with

intellectual functioning or problem solving. The Columbia Mental Maturity Scale was chosen because it provided a view of intellectual functioning which could be used to determine relationship if any.

Data Analyses

Following the completion of testing with the PRPT and the CMMS, the data derived were recorded on a punched card for each student as: birthdate, mental age (MA) (in months), chronological age (CA) (in months), Columbia Mental Maturity Scale score (CMMSs), total degrees deviation, average degrees deviation, and sex. These data were analyzed by the application of Statistical Package for the Social Sciences (SPSS) (Nie, Hull, Jenkins, Brenner & Brent, 1975) programs. The Goodness of Fit Test, Pearson Product Movement Correlation and t-test were used to analyze the data for testing the hypotheses.

Selection of the Sample

This investigation was concerned with the mentally retarded students in sheltered workshops of the State of West Virginia.

Presentation of the Findings

A summary of the finding and conclusions based on the analyses of the data follows.

Questions One, Two, and Null Hypothesis One

The findings of this study in comparing the observed distribution scores of the mentally retarded population to the distribution scores of Witkin's population using the Goodness of Fit Test (Downie & Heath, 1970) require the rejection of null hypothesis one. Analysis of the data reveal that there are significant differences in the distributions between Witkin's group and the group of mentally retarded students on the PRFT ($p<.05$). The study population has a more uniform or equal distribution across all deviations than Witkin's population. Witkin's population was more field-independent and the mentally retarded population distribution patterned indicated more field-dependents.

In response to questions one and two, the PRFT apparatus can be readily used to identify field-dependence and field-independence among the mentally retarded population. Although the percentage results of the mentally retarded population were different from the general population, the PRFT proved to be an effective manner in which to identify field-dependence and field-independence in the mentally retarded population (See Table 2).

Question Four and Null Hypothesis Two

Analysis of data failed to reject the null hypothesis regarding the relationship of mental ages of the retarded population and their scores on the PRFT. In examining the

Pearson Moment Correlation Cofficients (Table 3) of the PRFT and mental age no significant correlation emerged.

Therefore, among the mentally retarded population, age was not an influencing variable in using the PRFT to identify field-dependence or field-independence. Witkin stated that age and sex differences have been associated with field-dependence. Witkin, Dyk, Paterson, Goodenough, and Karp (1962, 1974) summarized research findings which indicate that individuals move from field-dependence toward field-independence with age, reaching relatively stable modes by the late teenage years.

Question Three and Null Hypothesis Three

An examination of the data (Table 4) using the *t*-test indicates that null hypothesis three failed to be rejected. There were no statistically significant differences between the PRFT scores comparing males and females ($p>.05$).

Consequently, no significant difference was observed in the PRFT scores when analyzed according to sex. In as much as these participants had a mental age up through 13 years 11 months, this finding is similar to findings reported by Witkin (1974) of normal children of the 5 to 8 year range. However, at ages younger than eight, the sex difference cannot be easily investigated by some perceptual instruments. Studies of children in the five to eight year range, with perceptual tests similar to the RFT, suggest that there

may be no significant sex differences in field-dependence and field-independence at these young ages (Witkin, 1974).

Conclusions

The following conclusions are supported by the analyses and interpretations of data presented in this study.

1. There is a significant difference between the mentally retarded population used in this study and the population used by Witkin. Curriculum developers and teachers should be aware of this difference in cognitive learning styles related to field-dependency of retarded populations when developing and implementing materials addressing these students needs.

2. The findings of this study indicate that the Portable-Rod-and-frame Apparatus is an appropriate instrument to use in identifying the degree of field-dependence and field-independence as preferred learning styles among the mentally retarded population in sheltered workshops since it is independent of reading comprehension and is perceptual rather than intellectually oriented.

3. The mentally retarded population in sheltered workshops was significantly different from the population used by Witkin in his research in the determination of field-dependence and field-independence. The differences in the PRFT scores were found to have no statistical relationship between mental age and PRFT and there were no significant differences between male and female students of the mentally

retarded population as determined by the use of the PRFT. Therefore, the PRFT can be used to determine relative field-dependency of the mentally retarded regardless of sex and age.

Recommendations

Based on the findings and conclusions, the following recommendations are made:

1. Similar studies should be conducted to evaluate further the role of field-dependence and field-independence in the mentally retarded population.

2. Students of different IQ levels and mentally retarded students should be compared in order to determine if there are field-dependence and field-independence development sequences.

3. The Portable Rod-and-frame Apparatus should be used with other handicapped populations to determine field-dependence and field-independence.

4. The Portable Rod-and-frame Apparatus should be used with other atypical population to enrich understanding and knowledge of atypical development.

5. Field-dependent and field-independent styles should be considered in curriculum development for the mentally retarded.

6. Field-dependent and field-independent styles should be considered in relation to teaching styles used with the mentally retarded.

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